Jellyfish and EVA

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

Monsters have invaded the town again! Asuka invites her good friend, Jellyfish, to drive EVA with her.

There are n cities in the town. All the monsters are in city n. Jellyfish and Asuka are currently in city 1 and need to move to city n to defeat the monsters.

There are m roads. The i-th road allows one to travel from city a_i to city b_i. All the roads are **directed**. That is, one cannot travel from city b_i to a_i using the i-th road. Interestingly, all roads satisfy $a_i < b_i$.

Driving EVA requires two people to work together. However, Asuka and Jellyfish have not done any training together before.

Suppose that EVA is currently in city u. Jellyfish and Asuka will both choose an undestroyed road that starts at city u. Suppose Jellyfish and Asuka choose roads that end at cities v_1 and v_2 respectively. If $v_1 = v_2$, EVA moves to city v_1 successfully. Otherwise, EVA stays in city u and both roads that they have chosen will be destroyed.

It is possible that EVA is currently in city u ($u \neq n$) and there are no undestroyed roads that start at city u. In that case, the mission will be a failure. Otherwise, if they reach city n in the end, the mission is considered a success.

Every time they choose the roads, Jellyfish knows that Asuka will choose a road randomly. Now, Jellyfish wants to know, if she chooses the roads optimally, what is the maximum probability of the mission being successful.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 2000$). The description of the test cases follows.

The first line of each test case contains two integers, n and m ($2 \leq n \leq 5000$, $0 \leq m \leq \min(\frac{n(n-1)}{2}, 2 \cdot 10^5)$) — the number of the cities and the number of the roads.

In the following m lines of each test case, each line contains two integers a and b ($1 \leq a < b \leq n$) — representing a road from city a to city b.

It is guaranteed that for each test case, each road appears at most once.

It is guaranteed that the sum of n over all test cases will not exceed 5000 and that the sum of m over all test cases will not exceed $2 \cdot 10^5$.

Output

Output the maximum probability of the mission being successful if Jellyfish chooses the roads optimally.

Your answer will be accepted if the absolute or relative error does not exceed 10^{-9}. Formally, let your answer be a, and the jury's answer be b. Your answer is considered correct if $\frac{|a-b|}{\max(1,|b|)} \leq 10^{-9}$.

Example

standard input	standard output
3 3 2 1 2 1 3 7 8 1 2 1 3 1 4 1 5 2 6 3 6 4 6 6 7 10 20 1 2 1 3 1 4 1 5 1 6 2 6 2 7 2 8 2 9 3 4 3 7 3 8 3 10 4 6 4 8 4 10 6 10 7 8 7 9 7 10	0.500000000000 0.625000000000 0.491666666667

Note

In the first test case, Jellyfish will choose $v_1 = 3$, and Asuka will choose $v_2 = 2$ with a possibility of 0.5 and $v_2 = 3$ with a possibility of 0.5. The mission is considered a success with a possibility of 0.5.